REMARKS

The Examiner is thanked for the interview on August 5, 2002. In the interview, the undersigned discussed several features of the present invention, which are not disclosed in the cited art. For example, the undersigned pointed out that *Walko* does not disclose first and second confining elements that are positioned proximate the process region. Although the undersigned believes that this language should suffice, the undersigned has amended independent claim 1 in order to expedite prosecution. The undersigned also asked about the combination of *Lenz* and *Deguchi*, i.e., why the two references were combined together. The reasons for this question are shown in greater detail in the section below entitled "OTHER ISSUES UNDER 35 USC 103(a)."

In the Office Action, the Examiner rejected claims 1, 4 and 11-13 under 35 USC 102 and claims 1-13 under 35 USC 103. The rejections are fully traversed below.

Claims 1 and 15-21 have been amended. Claims 11 and 14 have been cancelled (the limitations of claim 11 was moved into claim 1). Claims 22-26 have been added. Thus, claims 1-10, 12-13, and 15-26 are pending in the application. Reconsideration of the application is respectfully requested based on the following remarks.

ISSUES UNDER 35 USC 102(e)

Claims 1, 4 and 11-13 have been rejected under 35 U.S.C. §102(e) as being anticipated by *Walko,* II, (U.S. Patent 6,051,100).

In contrast to *Walko*, claim 1 (and its dependents) specifically requires, "...a first confining element positioned proximate the periphery of the process region ... a second confining element positioned proximate the periphery of the process region ..." While *Walko* may disclose contaminant plates 40 and 140, *Walko* does not teach or suggest contaminant plates 40 and 140 that are proximate to the periphery of the process region of the chamber 14. In *Walko*, the contaminant plate 40 is positioned at the desired boundary between where the active plasma is desired and where no active plasma is desired and the contaminant plate 140 is positioned away from the region of the active plasma altogether. As shown in Fig. 1 of *Walko*, the contaminant plate 140 is located in the exhaust area below the contaminant plate 40 a distance away from the boundary of the active plasma. In contrast, as shown in Fig. 1 of the

present invention, the first and second confining elements 53, 54 are both positioned at the periphery of the process region. As stated in the specification on page 6, line 14, " as the term is employed herein, the process region of the process chamber refers to the region of the process chamber used for processing a substrate, as for example, the area directly above the substrate." Accordingly, the rejection is unsupported by the art and should be withdrawn.

Also in contrast to *Walko*, claim 1 (and its dependents) specifically requires, "...one of the confining elements is disposed in an upper portion of the process chamber and the other confining element is disposed in a lower portion of the process chamber ..." While *Walko* may disclose a contaminant plates 40 and 140, *Walko* does not teach or suggest a contaminant plate that is located in an upper portion of chamber 14. As shown in *Walko*, contaminant plates 40 is located in a lower portion of the chamber 14 and contaminant plate 140 is disposed beneath contaminant plate 40 outside the chamber 14. Thus, the rejection is unsupported by the art and should be withdrawn.

ISSUES UNDER 35 USC 103(a)

Claims 1-11 and 13 have been rejected under 35 U.S.C. §103(a) as being unpatentable over *Lenz* et al. (U.S. Patent 5,998,932) in view of *Deguchi* (U.S. Patent 5,006,192).

In contrast to *Lenz* and *Deguchi,* claim 1 specifically requires, "...a second confining element ...including an exposed insulating surface, which is configured to at least partially cover a non-exposed conductive core that is electrically grounded..." Neither reference teaches a non exposed conductive core. In *Lenz*, the electrically conductive shield 304 is exposed as shown in Figs. 3 and 4. In *Deguchi*, the shield 6 and electrode 10 are also exposed as shown in Figs. 1-3. In contrast, as shown in Figs. 1 and 2 of the present invention, the conductive core 80 is not exposed (e.g., non exposed), but rather isolated since it is covered on the sides by the inner ring 76 and insulating surface 82. In the case of the present invention, the insulating portion (e.g., insulating surface 82) shelters the conductive core so that the ambient RF is capacitively terminated to the conductive core (e.g., conductive core 80). No portion is exposed to the chamber environment and thus the rejection is unsupported by the art and should be withdrawn.

Claim 12 has been rejected under 35 U.S.C. §103(a) as being unpatentable over *Lenz* et al. (U.S. Patent 5,998,932) in view of *Deguchi* (U.S. Patent 5,006,192) as applied to claims 1-11 and 13 above and further in view of *Walko*, II (U.S. Patent 6,051,100).

The rejection to claim 12 should be withdrawn for at least the reasons given above.

OTHER ISSUES UNDER 35 USC 103(a)

Although the present invention is patentable over the prior art for at least the reasons given above, it is the undersigned's belief that the 103 rejections are improper and should be withdrawn. In particular, the Examiner has not met the burden of establishing a prima facie case of obviousness.

For one, there must be a basis in the art for combining or modifying references. Even if all elements of a claim are disclosed in various prior art references, the claimed invention taken as a whole cannot be said to be obvious without some reason given in the prior art why one of ordinary skill in the art would have been prompted to combine the teachings of the references to arrive at the claimed invention. MPEP 2143.01 provides: "the mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination."

With regards to this issue, the Examiner stated that it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the apparatus of *Lenz* so as to include the confining element of *Deguchi* because this would allow for further confinement of the plasma at the upper region of the processing chamber, therefore optimizing the apparatus and the process performed therein. However, there would have been no reason for one of ordinary skilled in the art to add the shield 6 of *Deguchi* to the structure 302/304 of *Lenz* to enhance plasma confinement as required by the claims. First, *Deguchi* is silent to using the shield 6 as a means for confining a plasma. This in of itself shows that there is no motivation to combine. In addition, although *Deguchi* teaches the shield 6 along with a limiter electrode 7, there is no teaching or suggestion that one should use the shield 6 with the limiter electrode 7 to enhance plasma confinement, especially at the upper region of the process chamber. Moreover, *Deguchi* teaches away from plasma confinement in regions outside the process region. In particular, *Deguchi* is directed at an in situ cleaning means that purposely forms plasmas outside of the

discharge space 5. For example, *Deguchi* states, "With the introduction of a discharge gas into the vessel 1 through the inlet port 1b, plasma 5a and 9a is formed not only in the discharge space 5 between the main electrode 3 and the table 1a, but also in the space 9 lying outside of the discharge space 5 by the glow discharge caused by the high voltage electric field formed therein (Col. 4, lines 24-30)." This is in direct contrast with the purpose of the present invention, which is to prevent plasma discharges from forming outside the plasma processing area. The prior art simply does not provide any impetus to do what the present invention has done and thus the rejection should be withdrawn, i.e., a prima facie case of obviousness does not exist.

Furthermore, the references are not properly combinable or modifiable if their intended function is destroyed. The CCPA and the Federal Circuit have consistently held that when a 103 rejection is based upon a modification of a reference that destroys the intent, purpose or function of the invention disclosed in the reference, such a proposed modification is not proper and the prima facie case of obviousness can not be properly made. An example of such an evaluation is *In re Gordon*, 733 F.2d 900, 221 USPQ 1125 (Fed. Cir. 1984).

With regards to this issue, *Lenz* provides a focus ring assembly that is configured to substantially reduce the density of equipotential field lines in the region outside of the focus ring and *Deguchi* provides a system for forming a high voltage electrical field in a space comprising the discharge space between the main electrode and the opposing electrode and the space lying outside thereof. One is directed at forming electric fields outside the discharge area while the other is directed at preventing electric fields outside the discharge area. As should be appreciated, if combined these two features would work against each other possibly making them both inoperable. One of ordinary skill in the art simply would not combine these two references since *Deguchi* would destroy the function of *Lenz*. A prima facie case of obviousness does not exist and thus the rejection should be withdrawn.

Moreover, the prior art teaches away from the claimed invention. The Supreme Court held is U.S. v. Adams that one important indicium of nonobviousness is "teaching away" from the claimed invention. In short, teaching away is the antithesis of art suggesting that the person of ordinary skill in the art go in the claimed direction.

With regards to this issue, it is believed that *Deguchi* teaches away from the claimed invention for at least some of the reasons given above. For example, claim 1 is directed at a

plasma confining assembly for minimizing unwanted plasma formations in regions outside of a process region in a process chamber and *Deguchi* is directed at an in situ cleaning means that purposely forms plasmas outside of the discharge space 5. As shown above, *Deguchi* states, "With the introduction of a discharge gas into the vessel 1 through the inlet port 1b, plasma 5a and 9a is formed not only in the discharge space 5 between the main electrode 3 and the table 1a, but also in the space 9 lying outside of the discharge space 5 by the glow discharge caused by the high voltage electric field formed therein (Col. 4, lines 24-30)."

Furthermore, claim 1 requires, "...wherein the first confining element and the second confining element substantially reduces the effects of plasma forming components that pass therebetween," claim 4 states, "...wherein the plasma forming components are charged particles or electric fields," and claim 5 states, "...wherein the first confining element and the second confining element are arranged to direct charged particles to the exposed conductive surface and sink charged particles therethrough to ground so as to reduce the density of charged particles in regions outside of the process region." This is in direct contrast with *Deguchi*, which provides a system for forming a high voltage electrical field in a space comprising the discharge space between the main electrode and the opposing electrode and the space lying outside thereof. One is directed at forming electric fields outside the discharge area while the other is directed at preventing electric fields outside the discharge area. A prima facie case of obviousness does not exist and thus the rejection should be withdrawn.

SUMMARY

Applicant believes that all pending claims are allowable and respectfully requests a Notice of Allowance for this application from the Examiner. Should the Examiner believe that a telephone conference would expedite the prosecution of this application, the undersigned can be reached at the telephone number set out below.

Respectfully submitted,
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APPENDIX

1. (Once Amended) A plasma confining assembly for minimizing unwanted plasma formations in regions outside of a process region in a process chamber, comprising:

a first confining element positioned proximate the periphery of the process region, and including an exposed conductive surface that is electrically grounded; and

a second confining element positioned proximate the periphery of the process region, and including an exposed insulating surface, which is configured **[for]** **to at least partially** cover**[ing]** a **[conductive portion]** **non-exposed conductive core** that is electrically grounded, the second confining element being spaced apart from the first confining element **such that one of the confining elements is disposed in an upper portion of the process chamber and the other confining element is disposed in a lower portion of the process chamber**,

wherein the first confining element and the second confining element substantially reduces the effects of plasma forming components that pass therebetween.

15. (Once Amended) The plasma confining assembly as recited in claim **[14]** **25** further including a pressure control ring formed from a dielectric medium and disposed between the first and second rings, the pressure control ring being configured for physically confining a plasma within the process region, while permitting the passage of process gases to pass therethrough.

16. (Once Amended) The **[plasma reactor]** **plasma confining assembly** as recited in claim **25** **[14 wherein the first electrode and the second electrode are parallel to one another, and]** wherein the exposed insulating surface is **configured to be** level with a top surface of the second electrode.

17. (Once Amended) The **[plasma reactor]** **plasma confining assembly** as recited in claim **[14]** **25** wherein the first ring is **configured to be** disposed between the first electrode and **[the]** **a** chamber wall **of the process chamber**, and wherein the second ring is **configured to be** disposed between the second electrode and the chamber wall **of the process chamber**.

18. (Once Amended) The **[plasma reactor]** **plasma confining assembly** as recited in claim **[14]** **25** wherein the first ring includes an inner ring and an outer ring, wherein the inner ring is formed from a dielectric medium and **is configured to be** disposed between the first electrode

and the outer ring, and wherein the outer ring includes the conductive **member of the first ring [surface, which is grounded]**.

19. (Once Amended) The **[plasma reactor] plasma confining assembly** as recited in claim **[14] 25** wherein the second ring includes an inner ring and an outer ring, wherein the inner ring is formed from a dielectric medium and **is configured to be** disposed between the second electrode and the outer ring, and wherein the outer ring includes **[a conductive core, which]** the conductive portion**[, which is covered by] and the** insulating **portion [layer, and which is electrically grounded]**.

20. (Once Amended) The **[plasma reactor] plasma confining assembly** as recited in claim **[14] 25** wherein the conductive element is a portion of the **process** chamber.

21. (Once Amended) The **[plasma reactor] plasma confining assembly** as recited in claim **[14] 25** wherein the first ring and the second ring **are configured to** extend in a radial direction relative to an axis of the process chamber, and wherein an outer edge of the first ring extends further than an outer edge of the second ring.